

# END-OF-FIELDWORK MANAGEMENT SUMMARY

## *Archaeological Resources Studies at Various Locations Adjacent to or in CUs 79 through 84 in River Section 3, Hudson River PCBs Superfund Site*

prepared for



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## **1.0 Introduction**

On behalf of the General Electric Company (GE), URS Corporation (URS) is carrying out terrestrial and underwater archaeological studies in areas of the Hudson River PCBs Superfund Site that could be affected by the dredging project being conducted by GE at that Site under the oversight of the U.S. Environmental Protection Agency (EPA). This End-of-Fieldwork Management Summary provides a summary of several supplemental tasks performed by URS in August and September 2013 to investigate a number of locations within, adjacent to, or potentially affected by operations in Certification Units (CUs) 79 through 84 of the Phase 2 dredge areas in River Section 3 of the Upper Hudson River. Specifically, this report summarizes the following activities performed by URS:

- Shoreline reconnaissance surveys of an island shoreline that abuts a portion of CU 80 and of a riverbank area (designated CSD-a) adjacent to CU 83 that had previously been identified as potentially archaeologically sensitive but for which access permission had not previously been obtained;
- Deep archaeological testing at an area, designated NDCA-b, adjacent to CU 81, where a Phase I survey had indicated the need for deeper testing;
- Field investigation by camera of four additional underwater magnetic targets in or near CUs 80 and 81 that were identified by the National Park Service (NPS) during its 2012 remote sensing survey as potentially representing submerged cultural resources and that the NPS has requested URS to investigate; and
- Desktop review of the remote sensing data for six areas that may be used for access dredging or mooring locations in connection with the dredging in CUs 79 through 84.

More detailed reports will be submitted at a later date that present more complete information regarding these activities.

## 2.0 Additional Phase I Shoreline Investigations

As noted in the document titled *Terrestrial Archaeological Resources Survey: End-of-Fieldwork Summary Report: Evaluation of Phase 2 Dredge Areas Below Northumberland Dam (River Section 3)* (Terrestrial Fieldwork Summary Report; URS 2013a), submitted in August 2013, the terrestrial archaeological field studies conducted in June and July 2013 did not include two of the areas identified for survey in the section containing CUs 79-84 due to lack of landowner permission to access those locations. These areas were NDCA-e (adjacent to CU 82) and CSD-a (adjacent to CU 83). Subsequently, access permission was obtained for area CSD-a. In addition, EPA requested that an island shoreline which abuts a portion of CU 80 be subjected to archaeological reconnaissance. The results of investigations at these two areas are presented below.

### 2.1 Shoreline Reconnaissance of CU 80

The western shoreline of an unnamed island that abuts a portion of CU 80 was visually inspected from a boat and via a surface inspection on foot on September 9, 2013. The western shoreline of the island exhibits a low T1 terrace several meters away from the CU, with a lower T0 mudflat between it and the edge of CU 80 (**Figure 1**). No features or artifacts were observed, and this inspection confirmed the previous assessment that the terrain abutting the edge of the CU is relatively low and poorly drained and should not be considered to have archaeological high sensitivity. Based on this reconnaissance, we conclude that dredging activities in CU 80 adjacent to this island will have no adverse impacts on potentially significant archaeological deposits because there are no such deposits adjacent to the CU. We therefore recommend that no additional archaeological studies be required for the portion of CU 80 that abuts this unnamed island.



**Figure 1. Photograph of Western Shoreline of Unnamed Island, View East Showing Low T0 Terrace (at edge of waterline).**

## **2.2 Area CSD-a (CU 83)**

Area CSD-a is a wooded field edge on the east bank of the Hudson River. The northern third is situated on a high T1 terrace approximately 1.0 to 1.5 meters above the Hudson River (**Figure 2**); the southern two-thirds is situated on a low T0 terrace consisting of recent alluvium and gravel deposits (**Figure 3**). Area CSD-a was subjected to shovel testing on September 12, 2013. Proceeding north-to-south, the first four shovel test pits (STPs) were excavated along a transect at 15-meter intervals in the northern third of the area. No cultural materials were recovered from these STPs. South of STP A-04 (the southernmost of these STP), the survey transect dropped down to the T0 terrace. Two judgmental shovel tests were conducted in this area, revealing a thin (approximately 10 centimeter thick) layer of recent alluvium overlying gravel deposits and no cultural materials. In addition, the entire southern two-thirds of area CSD-a was visually inspected, but no STPs were excavated aside from the two judgmental shovel tests. This visual inspection did not exhibit any evidence of the potential presence of cultural materials.

In summary, the shovel tests and visual inspection of area CSD-a did not produce cultural materials and did not exhibit any evidence of archaeologically sensitive soils or deposits. As a result, we recommend that no further work be required in Area CSD-a prior to dredging activities in CU 83.



**Figure 2. Photograph of T1 Terrace in Area CSD-a, View South (Hudson River to right).**



**Figure 3. Photograph of Low T0 Terrace in Area CSD-a, View North.**

### 3.0 Deep Testing at Archaeological Area NDCA-b

As discussed in the Terrestrial Fieldwork Summary Report (URS 2013a), URS performed a Phase I survey and shovel testing in July 2013 in the archaeological area designated as NDCA-b, which is adjacent to two sections of CU 81 on the eastern side of the Hudson River (**Figure 4**). During this investigation, eight STPs were excavated at 15-meter intervals adjacent to the two portions of CU 81. The shovel testing began just south of the southern edge of the southern dredge area and proceeded northward to just north of the northern edge of the northern dredge area. None of these STPs produced cultural materials. However, soils encountered in the approximately one-meter deep STPs consisted of well-drained sandy soils with an upper A-horizon approximately 60 to almost 90 centimeters deep overlying a B-horizon; and it was noted that the shovel-tested landform is approximately 1.5 to 2 meters above the Hudson River water level. Given these conditions, URS concluded that it was unlikely that the shovel tests penetrated deep enough for a clear understanding of the presence/absence of cultural materials in deeply buried contexts. As a result, in *Addendum No. 1 to Terrestrial Archaeological Resources Survey Work Plan for Phase 2 Dredge Areas Below Northumberland Dam (River Section 3)* (URS 2013c), submitted on September 4, 2013, URS recommended that deep subsurface testing be conducted in area NDCA-b to adequately determine the presence or absence of cultural materials and archaeologically sensitive soil layers deeper than one meter.

In accordance with that addendum, deep testing of area NDCA-b was performed on September 10 and 11, 2013, consisting of augering and excavation of a test unit (TU). A total of six auger tests (ATs) and one TU were excavated during this time. The ATs extended our understanding of soils deeper than one meter, but did not recover any cultural materials or identify any archaeologically sensitive soil layers. The TU further corroborated the soils data from both STPs and ATs, and it produced a few cultural materials that were clearly redeposited from another location and do not represent an archaeological resource. These findings are discussed further below (following a brief summary of the findings from the prior STPs).

**Shovel Test Pits.** As discussed in the above-referenced submittals (URS 2013a, 2013c), the eight STPs excavated at area NDCA-b during the July 2013 Phase I survey were all sterile of cultural materials. Soils encountered included an Ap-horizon of dark brown (10YR 3/3) to very dark grayish brown (10YR 3/2) sandy loam overlying a B-horizon of brown (10YR 4/3 or 5/3) to grayish brown (10YR 5/2) loamy sand. The A-horizon was a minimum of 31 centimeters thick to a maximum of 88 centimeters thick. Half (n=4) of the STPs exhibited an A-horizon 50 centimeters thick or thicker, and three-fourths (n=6) exhibited an A-horizon that was 40 centimeters thick or thicker. In all STPs, the B-horizon extended to the base of units (typically 80-100 centimeters overall depth).



Figure 4. Map of URS' 2013 Phase I Results in Survey Area NDCA-a2.

**Auger Tests.** Six ATs were excavated at area NDCA-b. These were placed roughly between the initial STPs. Specifically, the ATs were spaced 15 meters apart, but were placed 7.5 meters from the previous STPs. The auger used was a four-inch-diameter bucket auger that allowed for excavation to 190 centimeters in depth (**Figure 5**). No artifacts were recovered from any of the ATs. All six ATs encountered the same soil package, consisting of four strata. The first two strata were the same as described above for STPs. ATs documented that Stratum II extended to depths of 85 to 120 centimeters below the ground surface. Underlying this was a B2-horizon of yellowish brown (10YR 5/6) silty sand (Stratum III) and a B3-horizon of yellowish brown (10YR 5/4) silty sand (Stratum IV). Stratum III ended between 125 and 168 centimeters below the ground surface; Stratum IV extended to the base of all ATs.



**Figure 5. View of Auger Testing at NDCA-b, View North.**

**Test Unit.** A single TU measuring one meter (north-south) by two meters (east-west) was excavated to gain a better understanding of the soils as well as to provide a larger sample for the potential recovery of artifacts (**Figure 6**). The TU was excavated in arbitrary 10-centimeter levels within natural strata. The whole TU was excavated to a depth of 90 centimeters, and the eastern half was excavated further to a depth of 132 centimeters. An AT was placed in the base of this TU to reach an overall depth of 305 centimeters below the ground surface. The TU encountered the same four strata described for ATs above (**Figure 7**). The AT in the TU encountered the same fourth stratum (B3-horizon) to its base at 305 centimeters. Groundwater was encountered in the AT at 275 centimeters, and the B3-horizon below that depth exhibited mineral staining typical of near-constantly saturated conditions (e.g., iron and manganese stains).

The TU produced five artifacts. These were all recovered from a small horizontal and vertical area in the eastern part of the TU at a depth of approximately 50-55 centimeters in the B1-horizon (Stratum II, excavation level 5). The five artifacts consist of four prehistoric items (three chert flakes and a quartzite

fire-cracked rock fragment) and one historic item (coarse earthenware ceramic sherd). Given the horizontally and vertically limited location of these items, coupled with the mix of prehistoric and historic items, we believe that these items were redeposited from another location, likely the result of bioturbation or flooding.



**Figure 6. View of Test Unit Excavation at NDCA-b, View Northeast.**



**Figure 7. Photograph of Portion of TU 1 North Profile, View North.**

All excavations at area NDCA-b failed to identify any archaeologically sensitive soils. The soil package in that area consists of a disturbed plowzone overlying a series of culturally sterile B-horizons. All STPs and ATs failed to produce cultural materials. The TU produced five mixed artifacts from a spatially limited area in the B1-horizon. However, the nature of the artifacts and the location from which they were recovered indicate that they are the result of redeposition and do not represent a primary deposit of cultural materials. Therefore, they do not represent an archaeological site.

Given the lack of culturally sensitive soils, coupled with the lack of archaeological resources, we conclude that dredging activities at CU 81 will have no adverse impact on significant archaeological resources. Accordingly, we recommend that no further archaeological investigations be required prior to dredging of CU 81.

## 4.0 Underwater Camera Investigation of Four Targets

The report titled *Underwater Archaeological Resources Survey: Interim End-of-Fieldwork Summary Report: Evaluation of Select Targets in Certification Units 75 through 100* (URS 2013b), submitted in August 2013, noted that, in addition to the underwater investigations of potential cultural resources that were identified in the July 2013 work plan for such investigations, the NPS had requested that URS evaluate six magnetic perturbations identified by the NPS during its 2012 remote sensing survey. These targets are described in **Table 1**. (While only four of these anomalies are located in the CU 79-84 section of the river, the other two are also included here for completeness and comparative purposes.) Four of these six anomalies are located outside of CU boundaries and two are located within CUs (12-001070 in CU 80 and 12-003-36 in CU 87).

**Table 1. NPS Magnetic Targets Requested for Investigation by the NPS**

Anomaly Number	CU Number	Duration (Ft)	Sign	Amplitude (nT)	X (NY State Plane E, NAD83, Ft)	Y (NY State Plane E, NAD83, Ft)
12-001-70	80 (in)	68.0	D	86.0	737951.42	1552343.06
12-001-74	80 (out)	15.0	M	63.0	738567.46	1549212.87
12-001-82	80 (out)	n/a	n/a	n/a	738567.54	1549292.34
12-001-38	81 (out)	46.0	D	52.0	737735.12	1545883.50
12-003-06	87 (out)	57.0	D	35.0	730925.79	1515644.55
12-003-36	87 (in)	n/a	n/a	n/a	728161.27	1511285.95

As discussed in the above-referenced report (URS 2013b), two of these six targets (12-003-06 and 12-003-36) were investigated during July 2013 fieldwork. Target 12-003-06 near CU 87 was determined to be the remains of an early 20<sup>th</sup> Century wooden and metal axle from a piece of farm equipment. Target 12-003-36 in CU 87 was determined to be an intact metal 55-gallon drum embedded in the river bottom at the edge of the navigation channel.

The remaining four targets are located in the section of the river containing CUs 79-84, specifically in or near CUs 80 and 81, and were investigated on August 29, 2013. Their locations were re-established using GPS navigation equipment, and a color underwater video camera was lowered to the bottom. Multiple passes were made at each location to scan with the camera. No cultural items were identified at any of these locations. Based on the magnetic characteristics of these anomalies in comparison with previous remote sensing results documented for the Hudson River project, as well as the results of the video inspection, it is unlikely that these magnetic perturbations represent significant cultural resources. We therefore recommend that no further investigations of these perturbations be required prior to dredging in CUs 80 and 81.

## 5.0 Review of Access Dredging and Mooring Locations

GIS shape files of the areas proposed to be used for possible access dredging or mooring locations for dredging in CUs 79-84 were brought into the underwater remote sensing data base and evaluated to determine whether use of those areas could impact potential cultural resources. These areas were also compared with historic sensitivity zones developed from historic mapping. No cultural resource issues were identified in any of these areas. The characteristics of each location are briefly summarized below.

### Mooring Area 1 (108.61 m parameter) West Bank CU 80

Area 1 is located on the western bank of the river on the eastern side of CU 80 (coordinates 738089.021, 1552681.326) and is bordered by agricultural fields (**Figure 8**). No side-scan sonar anomalies were recorded in this area, but there is one small dipole located at the above coordinates. This anomaly does not have complex characteristics typically associated with a significant cultural resource and was not identified for further evaluation.

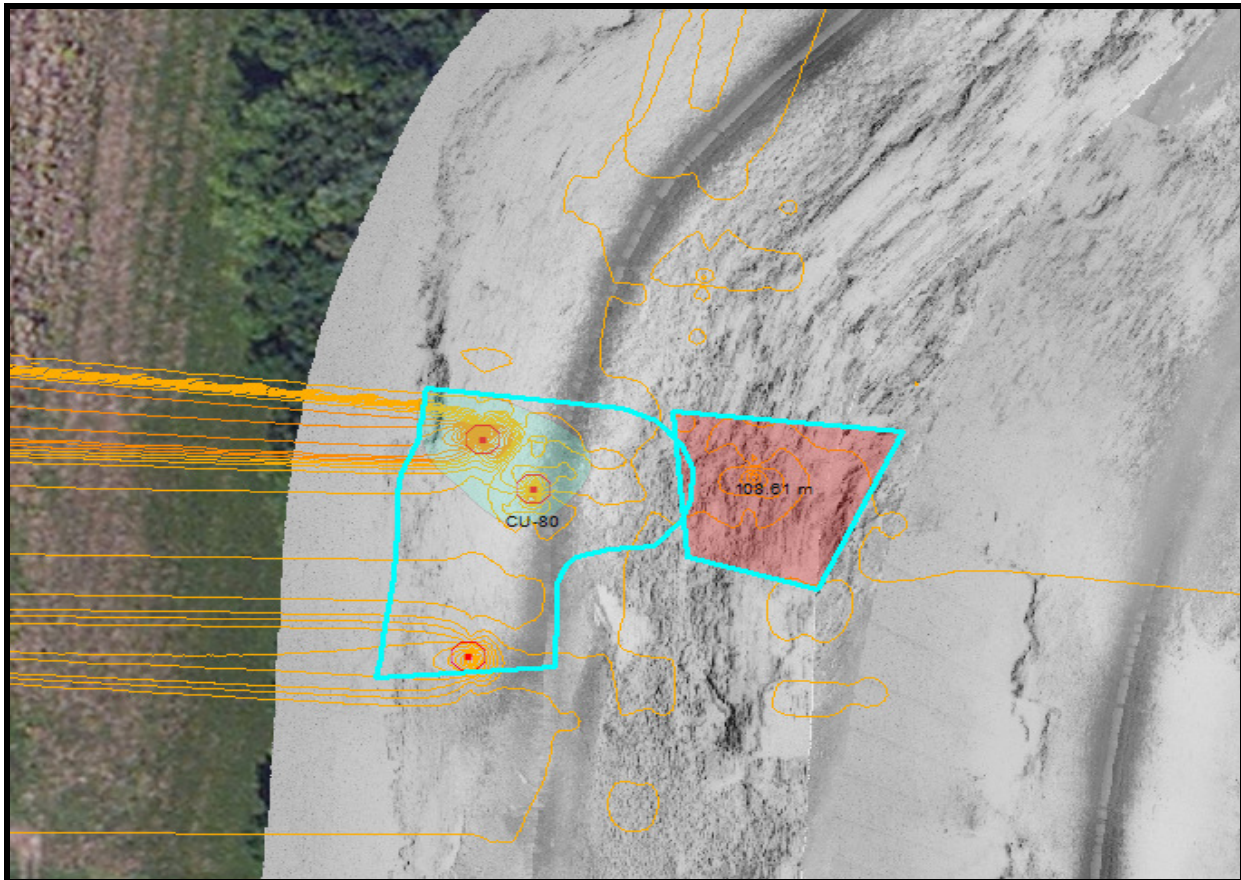
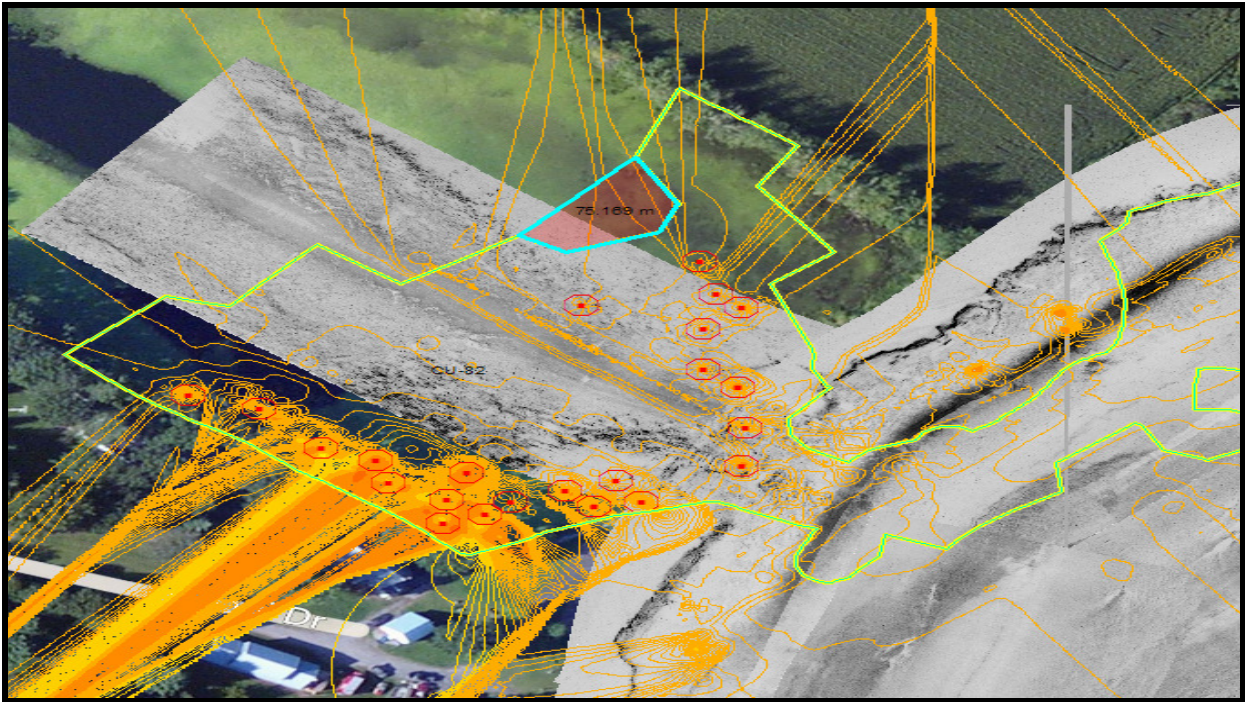


Figure 8. Mooring Area 1 CU 80

### Mooring Area 2 (75.169 m parameter) West Bank CU 82

Mooring Area 2 is located on the western bank of the river (**Figure 9**), in a small side channel leading to the Cove Marina in CU 82 (coordinates 736097.359, 1537964.263). The southern side of the channel has considerable disturbance due to modern house construction and land development. The northern side of the channel, where Mooring Area 2 is located, is bordered by agricultural fields. Both sides of the channel have several small magnetic anomalies that are located along the bank and fence lines. These anomalies are outside of Area 2 but are located within CU82's dredge prism. These magnetic anomalies lack the complexity and distribution associated with a significant cultural resource and have magnetic signatures and patterning associated with bankline debris dumping.



**Figure 9. Mooring Area 2, CU 82**

### Mooring Area 3 (75.169 m parameter) West Bank CU 83

Mooring Area 3 is located along the western bank of the river adjacent to CU 83 (**Figure 10**), and is bordered by agricultural fields (coordinates 738328.262, 1539958.443). No magnetic or acoustic anomalies were recorded in this area. Side-scan sonar data recorded scatters of tree limbs along the river bottom throughout this region.

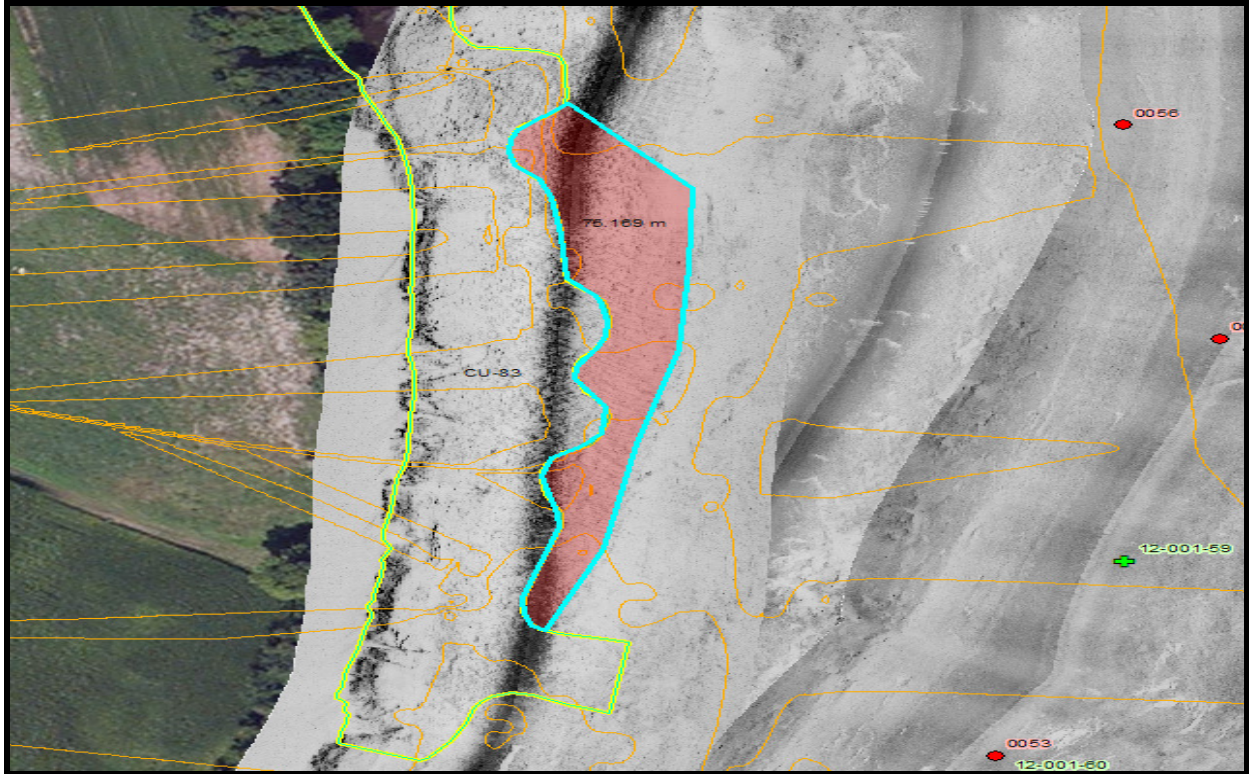
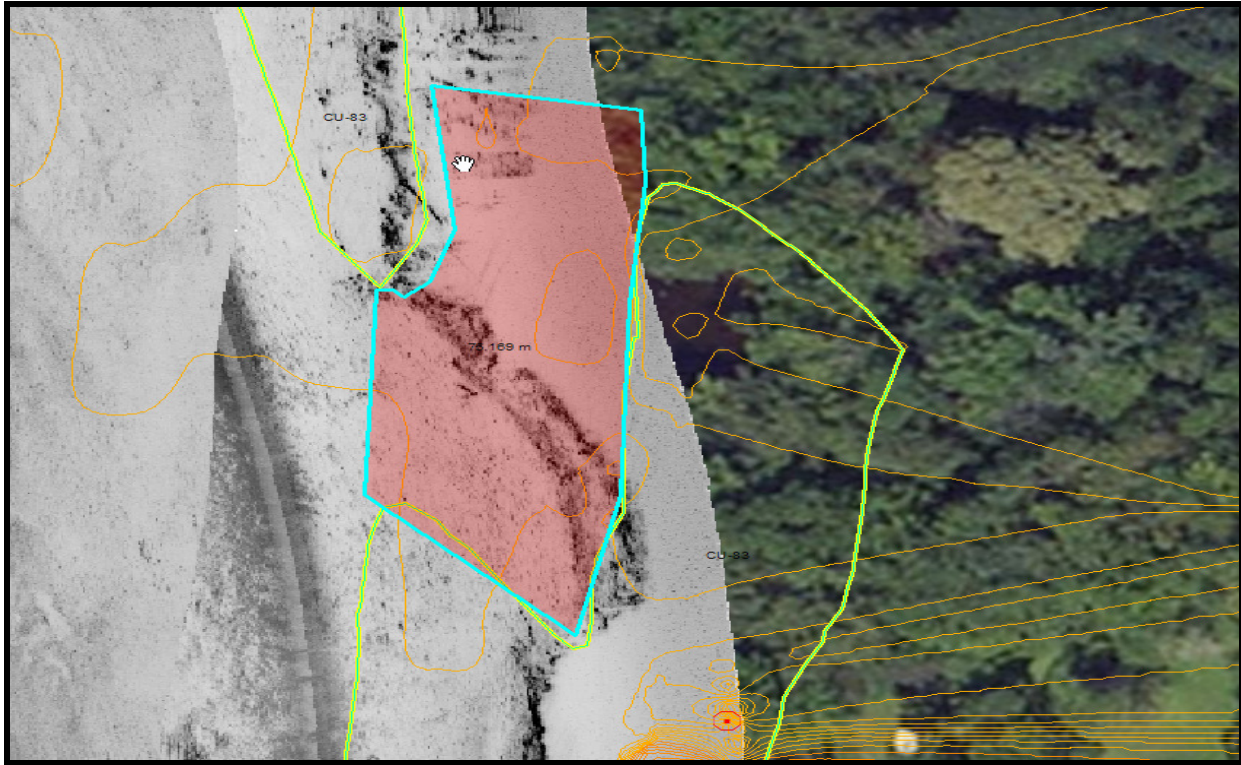


Figure 10. Mooring Area 3 CU 83.

#### Mooring Area 4 (75.169 m parameter) East Bank CU 83

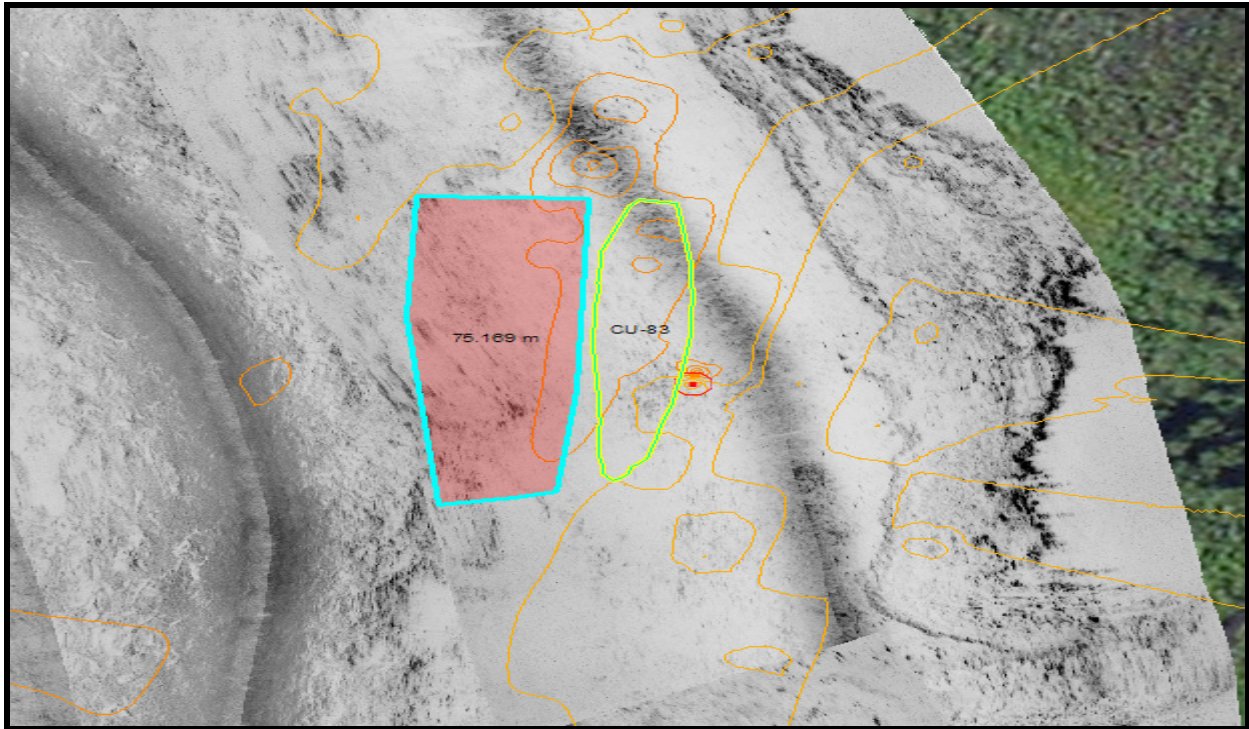
Mooring Area 4 is area is located between two portions of CU 83 along the eastern bank of the river (**Figure 11**), adjoining a heavily wooded area (coordinates 738936.962, 1540453.281). No magnetic or side-scan sonar targets were recorded in this area.



**Figure 11. Mooring Area 4 CU 83.**

### Mooring Area 5 (75.169 m parameter) East Bank CU 83

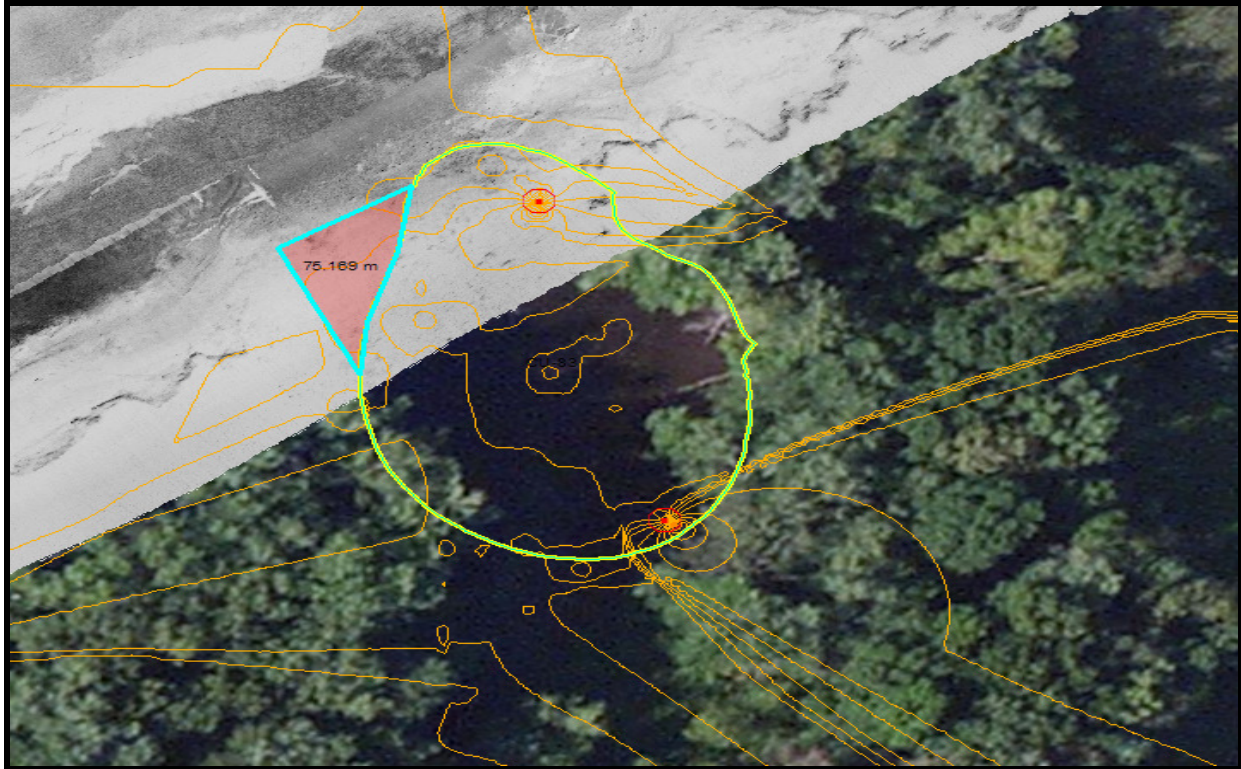
Mooring Area 5 is located on the eastern side of CU 83 along the eastern bank of the river (**Figure 12**), adjacent to a heavily wooded area (coordinates 736660.4221, 1535936.039). No magnetic or side-scan sonar targets were recorded in this area. There are a number of smaller simple dipole anomalies directly to the northeast, but they are outside of this area.



**Figure 12. Mooring Area 5 CU 83.**

### Mooring Area 6 (75.169m parameter) East Bank CU 83

Mooring Area 6 is located on the eastern side of CU 83 along the eastern bank of the river (**Figure 13**), adjacent to a wooded area bordered by agricultural fields (coordinates 739782.316, 1537569.31). No magnetic or side-scan sonar targets were recorded in this mooring area. There are two small simple dipole anomaly directly to the north and east of this area within CU 83.



**Figure 13. Mooring Area 6 CU 83.**

### Conclusion

Based on review and analysis of the remote sensing data collected in these six additional dredge mooring areas, none of the proposed areas has anomalies recorded in them that have the characteristics of complex or multi-component anomalies associated with significant submerged cultural resources. The use of these areas for accessing the dredge prism or mooring of ancillary vessels will not adversely affect any potential cultural resources.

## 6.0 References

URS. 2013a. *Terrestrial Archaeological Resources Survey; End-of-Fieldwork Summary Report; Evaluation of Phase 2 Dredge Areas Below Northumberland Dam (River Section 3)*. Prepared by URS Corporation for General Electric Company. August 22.

URS. 2013b. *Underwater Archaeological Resources Survey: Interim End-of-Fieldwork Summary Report: Evaluation of Select Targets in Certification Units 75 through 100*. Prepared by URS Corporation for General Electric Company. August 22.

URS. 2013c. *Addendum No. 1 to Terrestrial Archaeological Resources Survey Work Plan for Phase 2 Dredge Areas Below Northumberland Dam (River Section 3)*. Prepared by URS Corporation for General Electric Company. September 4.